SOP-20

Pit Lake Water Level Measurement

Yerington Mine Site
Standard Operating Procedure

Revision 0
Revision Date: January 11, 2008

SOP-20
PIT LAKE
WATER LEVEL MEASUREMENT

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1.0 OBJECTIVES

The objective of this Standard Operating Procedure (SOP) is to provide the methods to be used for the consistent monitoring and down loading of water level measurement data from the pit lake located on the mine site in Yerington, Nevada.

2.0 SCOPE AND APPLICABILITY

This SOP describes the procedure for the field acquisition and documentation of pit lake water level data, measured as the water column height above the surveyed referenced elevation of the transducer. Lake water levels are monitored continuously using electronic data loggers and pressure-sensitive transducers and are recorded on an hourly and daily basis. The procedure applies to all Brown and Caldwell and contracted personnel authorized to operate, maintain equipment or assist in associated tasks.

Successive measurements of pit lake levels may be used to assess seasonal and/or diurnal fluctuations, understand pit lake water balance conditions including inflow and evaporation rates, establish hydrogeologic relationships between the pit lake and surrounding bedrock and alluvial aquifers and predict the ultimate pit lake level 'Steady Condition" as required by the "Remedial Investigation Work Plan for Yerington Pit Lake (Operable Unit 2)."

3.0 RESPONSIBILITES

The *Project Manager* is responsible for ensuring that lake level measurements are implemented in accordance with this SOP and any other site-specific or project specific planning documents.

The *Field Personnel* are responsible for understanding and implementing this SOP during all field activities, as well as obtaining the appropriate field logbooks, forms and records necessary to complete the field activities.

The *Site Safety Officer (SSO)*, typically the supervising field manager, is responsible for overseeing the health and safety of employees and for stopping work if necessary to fix unsafe conditions observed in the field.

4.0 INSTALLED EQUIPEMENT

A SPXD 600/610 Serial Digital Interface Submersible Transducer is positioned inside 1.5-inch conduit and connected via data cable to a data logger. The transducer is installed below the surface of the lake and is accessible from a graveled access ramp located on southwest side of Pit Lake. The data logger is positioned ~180 feet up the ramp and ~ 25 feet higher in elevation (4237.0 feet) than the initial lake level at time of installation (4212.3 feet) and is fitted with a solar panel and radio transmitter to allow for cable-less data downloading.

Three ten foot tall posts have been installed to be used as visual confirmation of the transducer water level data. Semi-permanent marks have been placed on the posts at one-foot intervals as measured by professional survey.

4.1 Field Equipment

The following equipment/materials are needed for down loading measurement data from the pit lake transducer.

- Bound field log book
- Lap top computer with appropriate software installed
- Campbell Scientific RF401 Antenna
- ELK sealed lead 12V battery
- Serial data cable
- USB Flashdrive (for transferring data to server)
- Camera
- Binoculars

5.0 PROCEDURES

The following outlines the procedures for remote downloading of data and transferring data onto server.

5.1 General

1. Review site specific JSA
2. Record time, temperature and temperature, field personnel and any other pertinent information in field book.
3. It is not necessary to drive into pit. Drive to an area that allows a line-of-sight view to the datalogger and is safe. The recommended location is along the Southeast end of pit in the vicinity of the erosion channel or pit view-point shelter.
4. Park so that the computer and antenna are able to set on a stable surface.

5.2 Computer Set-Up

1. Turn on computer and log on.
2. Connect gray serial data cable to the antenna and the computer.
3. Connect the battery to the antenna. Green and red lights on antenna should be illuminated.

5.3 Data Retrieval from Transducer

1. Activate the "LoggerNet" program (Campbell Scientific) by clicking on the program icon on the desktop.
2. Click "Connect" on toolbar.
3. Select "YerPitLevel" from the list of stations.
4. Click "Connect" in the left corner of the Connect screen.
5. Click "Collect Now" in the Data Collection section in the top central portion of the Connect Screen. Data will begin downloading and may take several minutes to complete.
6. Confirm data was correctly received by clicking the "View Data" button in the lower right corner and selecting the data file you want to view. Confirm that the most recent data point at the bottom of the list is today's or yesterday's date.

5.4 Visual Confirmation

Occasionally, the accuracy of the transducer data should be crossed-checked with the physical survey posts located on the ramp in the pit using the following procedures:

1. Drive into the pit to access the pit lake using the ramp on the South side. This should be done as a two person team and only if the area is determined to be safe from falling rock or wall collapse hazards.
2. View water level on survey post, use binoculars if necessary, and estimate the water level to the nearest 0.1 foot. Record the results in the field log book.
3. Take photograph of water level on survey post.

5.5 Data Transfer to Server

1. Turn on computer, type in password
2. Insert flash drive into laptop
3. Click on "CampbellSci Loggernet" folder icon on computer desktop or navigate to folder location c:\campbellsci\LoggerNet
4. Select data files "YerPitLevel_Daily.dat and YerPitLevel_Hourly.dat" and copy/paste to flash drive.
5. Remove flash drive from laptop and insert into desktop.
6. Copy and paste data from flash drive to project folder on BC Carson City server.
7. Check battery status of computer and battery pack, recharge as necessary.
8. Download photographs from the camera and save to the project folder with a file name that includes the date the photo was taken.

6.0 TROUBLESHOOTING

1. If the red and green lights located on antenna are not visible, check connections.
2. If lights still are not visible wiggle the connections (pink and blue) on battery. If the problem still persists the connections may have to replaced or the battery may need to be recharged or replaced.
3. If "Communications with Station Failure" error message pops up, reposition antenna or move to another location.
4. If error message continues to pop up it may be necessary to drive into the pit positioning yourself within 50 feet of the radio transmitter. Review JSA-028 Pit Lake Transducer Installation prior to driving into pit.
5. If the problem still persists, check datalogger, transducer, Campbell Scientific's software and call for assistance.